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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/496,506	02/02/2000	Munir H. Nayfeh	1201.63407	6344

24978 7590 05/06/2003

GREER, BURNS & CRAIN  
300 S WACKER DR  
25TH FLOOR  
CHICAGO, IL 60606

EXAMINER

CRANE, SARA W

ART UNIT

PAPER NUMBER

2811

DATE MAILED: 05/06/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No. 09/496,506	Applicant(s) NAYFEH ET AL.	
	Examiner Sara W. Crane	Art Unit 2811	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 10 February 2003 (RCE filing).
- 2a) ☐ This action is FINAL.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1,2 and 4-8 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2 and 4-8 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

### Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

### Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 21.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

**DETAILED ACTION**

***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-2 and 4-8 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

As noted in the previous Office action, the record of this case provides no teaching of how to make silicon nanoparticles having a diameter of approximately 1 nm. Applicant refers to a co-pending case, 09/ 426,389, but the case file is not available to the undersigned examiner (because it is in issue). At any rate, the specific teachings relied upon for enablement need to be made of record in this case.

Also, with respect to claims 5-7, the specification does not provide any teaching of a device supporting single particle tunneling between a source and a drain through a plurality of silicon nanoparticles. Experimental data is presented with respect to the device of figure 1 of the specification, but the devices of figures 6 or 7 appear to be speculative. Specific differences between the two types of devices are: 1) the device of figure 1 has only a single particle, and the claims recite a plurality of particles, and 2) the device of figure 1 has a movable probe, and the claims recite source and drain

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~~electrodes which would not be movable.~~ While single-particle tunneling may have been shown with respect to the device of figure 1, undue experimentation would be required to generalize this result to produce a transistor having the regions recited in the claims. This is a particular problem with claims 6 and 7, which require hole creation by irradiation.

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***Claim Rejections - 35 USC § 103***

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1, 4, 5, and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen et al. in view of Forbes and Pankove et al.

See the Office action of 5 November 2002, which notes that Forbes, in particular, teaches each element of for example claim 1.

Claims 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over the references as applied to claims 1, 4, 5, and 8 above, and further in view of Matsumura et al.

Application of light to move carriers between a quantum box and a channel is motivated by Matsumura et al., as noted in the Office action of 4 October 2001.

***Conclusion***

Applicant's remarks of 10 February 2003 have been considered, but are not convincing. The examiner's interpretation of the Chen reference is set forth in the previous Office actions, but this reference is largely moot in view of the Forbes teaching, which discusses particles having a diameter of approximately 10 Angstroms to 100 Angstroms, which encompasses 1 nm. Applicant notes that the shape may not be spherical, but the pending claims do not say anything about spherical particles.


Applicant also notes that the Forbes teaching may misrepresent the sizes obtained in the prior art. Examiner can see no reason whatever to believe that the Forbes teaching is unreliable, however. Issued patents are presumed to be valid.

Applicant is urged to present claims drawn to the embodiment of figure 1, where the single particle tunneling is associated with irradiation of light as disclosed. Also, perhaps claim 2 could be expressed in completed form.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to S. Crane, whose telephone number is (703) 308-4894.

The fax phone number for this Group is (703) 308-7722.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist, whose telephone number is (703) 308-0956.

  
Sara W. Crane  
Primary Examiner  
Art Unit 2811